

CLAIMS:

1. **A coil comprising**
a layer of permeable material (4) deposited in a chip (CH) of an integrated circuit (IC) in a plane substantially parallel to a surface (A) of a substrate (1) of the chip (CH),
5 a first conductor element (6a, 6b; BW10, BW11; 60a, 60b) arranged at a first side of the permeable material (4) facing away from the substrate (1),
a second conductor element (2a, 2b; T1, T2) arranged at a second side of the permeable material (4) opposite to the first side,
an interconnection (8a, 8b; P2, P4) for interconnecting a first end of the first conductor element (6a, 6b; BW10, BW11; 60a, 60b) and a first end of the second conductor element (2a, 2b; T1, T2), wherein the interconnection (8a, 8b; P2, P4), the first conductor element (6a, 6b; BW10, BW11; 60a, 60b) and the second conductor element (2a, 2b; T1, T2) are arranged for forming a winding around the permeable material (4), the winding extending in a plane substantially perpendicular to the surface (A) of the substrate (1).
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2. **A coil as claimed in claim 1, wherein the first conductor element (6a, 6b; BW10, BW11; 60a, 60b) is part of the integrated circuit (IC).**
- 3 **A coil as claimed in claim 2, wherein the first conductor element (6a, 6b; BW10, BW11; 60a, 60b) comprises a bond wire (BW10, BW11).**
4. **A coil as claimed in claim 2, wherein the first conductor element (6a, 6b; BW10, BW11; 60a, 60b) comprises a conductive track (60a, 60b) on the chip (CH).**
- 25 5. **A coil as claimed in claim 1, wherein the second conductor element (2a, 2b; T1, T2) comprises a conductive track (2a, 2b) on the chip (CH) and is arranged between the permeable material (4) and the substrate (1).**

6. A coil as claimed in claim 1, wherein the second conductor element (2a, 2b; T1, T2) comprises a conductive track (T1, T2) arranged on a printed circuit board (PCB) for carrying the integrated circuit (IC).
- 5 7. A coil as claimed in claim 1, wherein a plurality of first conductor elements (6a, 6b; BW10, BW11; 60a, 60b) is arranged at a first side of the permeable material (4) facing away from the surface (A) of the substrate (1),
a plurality of second conductor elements (2a, 2b; T1, T2) is arranged at a
10 second side of the permeable material (4) opposite to the first side, and
a plurality of interconnections (8a, 8b; P2, P4) being arranged for
interconnecting the plurality of first conductor elements (6a, 6b; BW10, BW11; 60a, 60b)
and the plurality of second conductor elements (2a, 2b; T1, T2) in a chain, wherein the
interconnections (8a, 8b; P2, P4), the first conductor elements (6a, 6b; BW10, BW11; 60a,
15 60b) and the second conductor elements (2a, 2b; T1, T2) are arranged for forming a winding
around the permeable material (4) for conducting current (i) in turns of the winding being
substantially perpendicular to the surface (A).
8. A coil as claimed in claim 7, wherein the first conductor elements (6a, 6b;
20 BW10, BW11; 60a, 60b) are arranged substantially in parallel.
9. A coil as claimed in claim 7, wherein the second conductor elements (2a, 2b;
T1, T2) are arranged substantially in parallel.
- 25 10. A coil as claimed in claim 1 or 7, wherein the coil, when energized, generates
a magnetic field (B) having a direction substantially parallel with the surface (A).
11. A coil as claimed in claim 1 or 7, wherein the coil is arranged for being most
sensitive for a magnetic field component (B) having a direction parallel with the surface (A).
- 30 12. An integrated circuit (IC) comprising:
the chip (CH) with a substrate (1), the layer of permeable material (4)
deposited in the plane substantially parallel to the surface (A) of the substrate (1), and the

first conductor element (6a, 6b; BW10, BW11; 60a, 60b) arranged at the first side of the permeable material (4) facing away from the substrate (1),

the second conductor element (2a, 2b; T1, T2) arranged at the second side of the permeable material (4) opposite to the first side, and

5 the interconnection (8a, 8b; P2, P4) for interconnecting the first end of the first conductor (6a, 6b; BW10, BW11; 60a, 60b) and the first end of the second conductor element (2a, 2b; T1, T2), wherein the interconnection (8a, 8b; P2, P4), the first conductor element (6a, 6b; BW10, BW11; 60a, 60b) and the second conductor element (2a, 2b; T1, T2) are arranged for forming the winding around the permeable material (4), turns of the winding extending in
10 a plane substantially perpendicular to the surface (A) of the substrate (1) to form a coil as claimed in claim 1.

13. An integrated circuit as claimed in claim 12, wherein the chip (CH) further comprises:

15 the second conductor element (2a, 2b; T1, T2) being deposited on the substrate (1), and
an isolating layer (3) for isolating the second conductor element (2a, 2b; T1, T2) from the permeable material (4), the permeable material (4) being deposited as a layer on the isolating layer (3).

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14. An integrated circuit as claimed in claim 12, wherein the first conductor element (6a, 6b; BW10, BW11; 60a, 60b) comprises a bond wire (BW10, BW11).

15. An integrated circuit as claimed in claim 12, wherein the first conductor
25 element (6a, 6b; BW10, BW11; 60a, 60b) comprises a conductive track (2a, 2b) on the chip (CH), the chip (CH) further comprises an isolating layer (5) arranged in-between the permeable material (4) and the first conductor element (6a, 6b; BW10, BW11; 60a, 60b).

16. An arrangement of an integrated circuit (IC) and a printed circuit board (PCB)
30 for forming a coil as claimed in claim 1, wherein
the integrated circuit (IC) has at least one electrical conductive connection (P1, P2, P3, P4) with the printed board (PCB),
the chip (CH) comprises the layer of the permeable material (4),

the first conductor element (6a, 6b; BW10, BW11; 60a, 60b) is arranged at a first side of the permeable material (4) facing away from the substrate (1),

the second conductor element (2a, 2b; T1, T2) is arranged on the printed circuit board (PCB), and

5 the interconnection (8a, 8b; P2, P4) between the first conductor element (6a, 6b; BW10, BW11; 60a, 60b) and the second conductor element (2a, 2b; T1, T2) is made via the electrical conductive connection (P2, P4).

17. An electronic apparatus comprising a coil as claimed in claim 1.

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18. An electronic apparatus as claimed in claim 17 being a tag.

19. A two-dimensional antenna comprising:

a coil as claimed in claim 1, and

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a further coil comprising a conductor arranged around the layer of permeable material (4) in a plane substantially parallel to the surface, wherein the layer of permeable material (4) forms a core for both the first mentioned coil and the further coil.